Remarks

The Office Action mailed 7 November 2001 has been received and reviewed. Applicants cancelled claims 2, 6, 22 and 26 without prejudice. Claims 1, 3-5, 7-21, 23-25 and 27-39 are pending. Reconsideration and withdrawal of the rejections are respectfully requested.

Drawings

The Examiner objected to Figure 5B asserting that all boxes should be labeled with appropriate descriptive matter. Applicants respectfully traverse the objection and respectfully submit that the boxes shown in Figure 5B are labeled with reference numerals 176 and 180-186. As such, Applicants respectfully submit that all boxes shown in Figure 5B are labeled with appropriate descriptive matter.

The Examiner objected to Figures 3 and 11 as containing the text "Honeywell Confidential and Proprietary". Applicants include separate papers showing proposed changes in red ink to Figures 3 and 11. Applicants respectfully request consideration and approval of the amendments by the Examiner.

Claims

The Applicants cancelled claims 2, 6, 22 and 26 without prejudice, and amended claims 1, 3, 7, 8, 17, 21, 23, 24, 27, 28 and 37. Claim 1 has been amended to include at least certain limitations of claim 2. Claim 21 has been amended to include at least certain limitations of claim 22. The other claims have been amended to correct language of the claim for reasons of the other amendments.

Double Patenting Rejection

Claims 1-39 were provisionally rejected under the judicially crated doctrine of double patenting over claims 1-45 of copending U.S. Pat. Application No. 09/346,412. Applicants

respectfully traverse the rejection. Applicants will consider filing a terminal disclaimer after the rejection is no longer provisional.

The 35 U.S.C. §103 Rejection

The Office Action rejected claims 1-39 under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 4,675,147 to Schaefer *et al.* (hereinafter "Schaefer") in view of U.S. Patent No. 5,631,825 to van Weele *et al.* (hereinafter "van Weele"). Applicants address each rejection in detail as follows.

Applicants amended claims 1 and 21 to more clearly describe the claimed subject matter by the adding the limitations of claims 2 and 22 thereto, respectively. Insofar as the rejection is applied to claim 1 and 21, as amended, Applicants respectfully traverse the rejection of claim 1 and 21, as follows.

In claims 1 and 21, Applicants teach a computer implemented graphical user display for providing real-time process information to a user for a process that is operable under control of one or more process variables. The one or more of the process variables includes high and low process limit values associated therewith. The graphical user display includes one or more graphical devices, where each graphical device corresponds to a process variable. The graphical device for a corresponding process variable includes a display of a gauge axis and a first and second pair of high and low elements. The first pair of high and low limit elements are representative of engineering hard high and low limit values for the corresponding process variable. The second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable, where the first and second pair of high and low limit elements are displayed on the gauge axis. A graphical shape is displayed along the gauge axis representative of a value of the corresponding process variable relative to the process limit values.

Schaefer indicates that "[t]he real time actual and reference values of parameters pertinent to key safety concerns of a . . . power plant are used to generate an integrated graphic

display representative of the plant safety status" (Abstract). "Some of the status signals are analog and some are binary . . . limit signals are also generated [for the analog signals] and are normalized by locating indicia representative of all the high limits a second fixed distance from the common origin" (Col. 3, lines 50-55). "The actual values of the operating parameters are then indicated by locating the verticies of the polygon relative to the fixed distance on the appropriate scale determined by the current values of the reference signal and the limit signals (Col. 3, lines 56-61). So, the real time actual values of the operating parameters are plotted on the graphical display for monitoring the safety status of the plant.

Van Weele recites an operator station for a manufacturing process control system. The process control system of van Weele includes a network of at least one dedicated process control computer (PCC) for monitoring and controlling "SECTIONS" of the manufacturing process wherein each "SECTION" includes one or more "SEQUENCES" of the manufacturing process (van Weele, Abstract). Van Weele provides an "operator station 20 interface, [with] display means in the form of a primary display 26 and a secondary display 28" (Col. 17, lines 64-66). Van Weele recites that "there are selected specific application windows that are present upon startup of the operator station" and that these windows are "always present and cannot be removed, reduced in size, or iconized" (Col. 11, lines 25-29). "The following standard application windows are preferably located on the primary display: the SECTIONS Overview Window; the SEQUENCES Overview window; the Plant Overview Flowsheet Window; and the Flowsheet-Dependent Trend Window" (Col. 11, lines 30-35). The PCCs "each typically control a plurality of SEQUENCES which together define a portion or all of a manufacturing process and its control environment" (Col 7, lines 34-38). "A SECTION is a logical collection of SEQUENCES" (Col. 7, line 42).

Van Weele states that "SECTION Indicators and SEQUENCE Indicators both preferably contain an object called a Critical Success Factor (CSF) . . . [where] [t]he goal of the CSF object is to provide the operator with an overall view of the status of a SECTION or SEQUENCE while consolidating the information of the operator in an abstracted indicator . . . . " (Col. 15, lines 49-

54). "The CSF calculation should be defined by the process control engineer in such a manner that it preferably produces a value within a predefined range . . . [which in] a preferred embodiment, a range of 0 to 1.0 is utilized, with zero indicating that the plant is operating under ideal circumstances and one indicating a plant upset condition" (Col. 15, line 66 – Col. 16, line 4).

To establish a *prima facie* case of obviousness, three basic criteria must be meet. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations.

Applicants respectfully submit that Schaefer and van Weele fail to teach or suggest all the claim limitations of claims 1 and 21, as amended. For example, Schaefer and van Weele fail to teach or suggest displaying a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable and a second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable, as recited in claims 1 and 21.

Schaefer recites that "[t]he values of parameters represented in analog form are dynamically scaled between the reference value and high and low limits which are displayed as tic marks at fixed distances along spokes radiating from the common origin and passing through the vertices" (Schaefer, Abstract). Van Weele recites that "[t]he CSF calculation should be defined by the process control engineer in such a manner that it preferably produces a value within a predefined range . . . [which in] a preferred embodiment, a range of 0 to 1.0 is utilized, with zero indicating that the plant is operating under ideal circumstances and one indicating a plant upset condition" (Col. 15, line 66 – Col. 16, line 4). Figure 33 of van Weele is recited to illustrate "a sample Change dialog box . . . the components typically employed in connection with a value change" (Col. 30, lines 33-35). "The value of the element can be changed directly in the value box 328" (Col. 31, lines 8-9). However, Schaefer and van Weele fail to teach or

suggest, besides other things, both a first pair of high and low limit elements representative of engineering hard high and low limit values and a second pair of high and low limit elements representative of operator set high and low limit values for a corresponding process variable, as recited in claims 1 and 21.

Applicants were unable to clearly understand what the Examiner was stating at page 3 of the Office Action, which stated "[t]he difference between the claim and Schaefer et al. is at least one pair of high and low limits elements displayed on the gauge axis representative of high and low process limit values for the in figure 33, column 16, lines 1-10, they do not explicitly teach defining the high and low limit of the process variables." Applicants generally traverse the Examiner's assertions, and respectfully request that the Examiner clarify such assertions so Applicants have a chance to more fully respond thereto.

Applicants further submit that the Examiner has failed to clearly identify some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The Examiner asserts that it "would have been obvious to one of ordinary skill in the art . . . to modify the gauge axis and the graphical shape taught by Schaefer et al. to include the user defining high and low limits of van Weele et al., in order to provide an operator station which presents process, thereby enabling human supervision of the plurality of manufacturing processes from a single physical location, as taught by van Weele et al." Applicants respectfully submit that they are unable to fully understand what the Examiner asserts is the motivation to combine the recited documents in the statement "in order to provide an operator station which presents process, thereby enabling human supervision of the plurality of manufacturing processes from a single physical location, as taught by van Weele et al." As such, Applicants traverse this assertion as not providing adequate motivation and ask the Examiner for clarification so Applicants have a chance to more fully respond thereto.

With respect to claims 2 and 22, the Examiner asserts that van Weele "discloses the at least one graphical device on (figure 28) includes a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable and a second pair of high and low limit elements representative of operator set high and low limit values." Based on this assertion, the Examiner states that "[s]o, it is easy to know that the operator set high and low limit values on the graphical device." Applicants respectfully traverse these assertions.

Van Weele recites that with respect to figure 28, "the operator station 20 of the present invention preferably includes an Alarm Grid Flowsheet Window 280, which includes a plurality of alarm boxes 282" (Col. 44, lines 20-23). "Each of the alarm boxes 282 is a process primitive associated with an alarm monitored by the operator station 20" (Col. 44, lines 23-25). "Selection of any alarm box 282 in the grid will invoke the common element pop-up menu associated with the process primitive represented by that box, thereby providing quick and easy access to detailed information about the selected alarm" (Col. 44, lines 39-43). Van Weele states that a process primitive "are the operator station symbols representing (1) basic points of control interaction between the PCC and the physical process and (2) other variables in the PCC" (Col. 2, lines 40-43). Figure 33 of van Weele displays "a sample Change dialog box 302 [that] illustrates the components typically employed in connection with a value change" (Col. 30, lines 33-35). "When the Change dialog box 302 is associated with a variable, the upper and lower limits for that variable are generally displayed . . . [where] a value change dialog box . . . [allows] the operator to quickly change the value of the selected element" (Col. 31, lines 1-6).

However, Van Weele fails to teach or suggest that either the Alarm Grid Flowsheet Window or the Change dialog box contains both a first pair of high and low limit elements representative of engineering hard high and low limit values and for the corresponding process variable and a second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable, as recited in claims 2 and 22. In addition, the Examiner has failed to present a suggestion or motivation, either from the

references themselves or from generally available knowledge, as to why one skilled in the art would have been motivated to modify the reference or to combine reference teachings as suggested by the Examiner. Applicants have cancelled claims 2 and 22, however, rendering the basis for the Examiner's rejection of claims 2 and 22 moot. However, at least certain limitations of such claims have been added to claims 1 and 21, respectively.

With respect to claims 3-5, 7-20 and 23-25, 27-39, Applicants respectfully submit that these claims are also patentable as further limitations of patentable base claims 1 and 21. Furthermore, claims 3-5, 8, 10, 11, 14, 15, 19, 23-25, 28, 30, 31, 34, 35 and 38, besides others, are each patentable over Schaefer and van Weele based on the subject matter recited in each of the claims.

For claims 3 and 23, Applicants respectfully submit that the Examiner has failed, besides other things, to identify where van Weele or Schaefer teach or suggest all the claim limitations, or to identify a suggestion or a motivation to combine van Weele and Schaefer.

The Examiner asserts that "[t]he difference between Schaefer et al. and the claim is the engineering hard high and low limit values of the corresponding process variable and a second pair of . . . parallel lines extending orthogonal to the gauge axis representative of the operator set high and low limit values for the corresponding process variable." The Examiner then asserts that van Weele "shows the operator set high and low limit values on figure 33, 338, column 31, lines 1-13." The Examiner, however, fails to point out where, for example, the second pair of pair of parallel lines extending orthogonal to the gauge axis representative of the operator set high and low limit values for the corresponding process variable is taught or suggested in either van Weele or Schaefer.

As for the motivation to combine van Weele and Schaefer, "There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of the persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). Applicants

respectfully submit that the Examiner has failed to identify a suggestion or a motivation to combine van Weele and Schaefer so as to arrive at the subject matter recited in claims 3 and 23.

For claims 4 and 24, Applicants respectfully submit that the Examiner has failed, besides other things, to identify where van Weele or Schaefer teach or suggest all the claim limitations, or to identify a suggestion or a motivation to combine van Weele and Schaefer. While the Examiner has asserted that "Schaefer et al. also teaches a single pair of parallel lines extending orthogonal to the gauge axis" and that "van Weele et al. show the operator set high and low limit values on figure 33, 338, column 31, lines 1-13", the Examiner has failed to show where van Weele or Schaefer teach or suggest a single pair of parallel lines on a gauge axis that represent both an engineering hard high and low limit values and an operator set high and low limit values, as recited in claims 4 and 24. In addition, Applicants respectfully submit that the Examiner has failed to identify a suggestion or a motivation to combine van Weele and Schaefer so as to arrive at the subject matter recited in claims 4 and 24.

For claims 5 and 25, Applicants respectfully traverse the rejection and repeat the arguments presented above for claims 3 and 23. In addition, Applicants respectfully submit that van Weele fails to teach or suggest that the second pair of parallel lines extending orthogonal to the gauge axis are displayed at a shorter length than and between the first pair of parallel lines extending orthogonal to the gauge axis representative of engineering hard high and low limit values along the gauge axis, as recited in claims 5 and 25.

Applicants have cancelled claims 6 and 26, rendering the basis for the Examiner's rejection of claims 6 and 26 moot.

For claims 7 and 27, Applicants respectfully traverse the rejection and repeat the arguments presented above for claims 1 and 21.

Claims 8 and 28 were amended to more clearly describe the claimed subject matter. Insofar as the rejection is applied to claim 8 and 28, as clarified, Applicants respectfully traverse the rejection. For claims 8 and 28, the Examiner asserts that "Schaefer et al. also demonstrates the graphical shape is positioned outside of the parallel lines when the value for the

corresponding process variable is outside the high and low process limit values by a predetermined percentage (figure 1, 16, column 8, lines 36-59)."

Claim 8 and 28 state in part that the graphical shape is positioned outside of the parallel lines of the second pair of high and low limit elements when the value for the corresponding process variable is outside the operator set high and low process limit values by a predetermined percentage. Column 8, lines 36-59 of Schaefer recites in part that for figure 1, "spokes 1 through 8 radiating from the common origin 0 each represents the scale for one or more process parameters . . . [where] points 9 through 16, which are all a fixed distance from the common origin 0, represent the target or reference value of the associated parameter or parameters." "The actual value of each parameter is also plotted on the associated spoke . . . [where] [p]ositive deviations from the target value are shown at the at points further away form the common origin 0 than the reference values and negative deviations are plotted closer to the origin." (Col. 8, lines 44-48). "When an actual value exceeds a limit in either direction, the vertice is plotted at the limit but since . . . the numerical value of the parameter appears on the display, the operator will be aware of the condition." (Col. 9, lines 35-39). Thus, Schaefer fails to teach or suggest displaying the graphical shape at position outside of the pair of parallel lines when the value for the corresponding process variable is outside the second pair of high and low elements representative of operator set high and low process limit values by at least a predetermined percentage, as recited in claims 8 and 28.

For claims 9 and 29, Applicants respectfully traverse the rejection and repeat the arguments presented above for claims 1 and 21.

For claims 10, 11, 30 and 31, the Examiner states "Schaefer et al. also shows the graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable to be maximized and the graphical symbol is representative of a corresponding process variable to be maximized (column 17, lines 4-17)." Applicants respectfully traverse these assertions. Column 17, lines 4-17 of Schaefer recite a "flow chart for the iconic program which utilizes the data developed in the preceeding [*sic*] programs to generate

the displays on the visual display units 57 and 58 . . . [where] [i]f the iconic or top level display has not been selected for display has not been selected for display on any of the visual display units . . . the remainder of the iconic program is not needed and is therefore not run . . . [a]ssuming that at least one observer is calling for the top level display, a determination is made in block 101 whether a reactor trip has occurred while the terminate . . . ." Applicants respectfully submit the cited section of Schaefer, or any portion of Schaefer, fails to teach or suggest either a graphical symbol representative of a corresponding process variable to be maximized or to be minimized, as recited in claims 10, 11, 30 or 31.

For claims 12, 13, 32 and 33, Applicants respectfully traverse the rejection and repeat the arguments presented above for claims 1 and 21 in support of the patentablility of claims 12, 13, 32 and 33.

For claims 14 and 34, the Examiner asserts that figure 28, column 44, lines 20-48 of van Weele teaches one graphical device, and that the difference between van Weele and the claim is a graphical symbol representative of the corresponding process variable being wound up. The Examiner asserts "Schaefer et al. shows the graphical symbol on (column 16, lines 25-51)." Applicants respectfully traverse these assertions.

Applicants respectfully submit that van Weele fails to teach or suggest the graphical device as provided in claim 14 and 34. For example, Van Weele fails to teach or suggest a gauge axis or a first pair and a second pair of high and low limit elements, as recited in independent claims 1 and 21 for which claims 14 and 34, respectively, are dependent claims.

As for the assertion that Schaefer shows the graphical shape, Applicants teach in claims 14 and 34 that the at least one graphical device displays a graphical symbol representative of the corresponding process variable being wound up. Applicants state that for a particular process variable that is in a wound up state "other process variables, having limits that effect this particular process variable, are up against limits and therefore this particular variable is wound up . . . [w]hen a wound up state is indicated, the dashed line is drawn next to the graphical shape in the direction the variable cannot move . . .[t]his state indicates that although the process

variable appears to have room to move, it will not because it is wound up (e.g., the downstream control device has reached a physical limit although the controlled variable is within acceptable limits)" (page 41 lines 13-27).

In contrast, Schaefer recites at column 16, lines 25-51 recites, in part, "the 'VECT A' subroutine for determining the analog scaling" where "the vector position or location of the vertice of the polygon is plotted at the reference point" when "the actual value of the parameter equals the reference value block . . . or the low limit equals the reference value and the actual value exceeds the reference value block . . . or the high limit equals the reference value and the actual value exceeds the reference value block. . . ." In addition, Schaefer recites that if "none of theses conditions exist, but the low limit is the reference value as determined in block 88, the vector position or location of the vertice of the polygon is calculated in block 89 as a positive deviation from the reference using Equation (1) . . . [o]n the other hand, if the reference value equals the high limit in block 90 or the actual value of the parameter is less than the reference value as determined in block 91, then the vector position is calculated . . . as a negative deviation from the reference using Equation (2) . . ." (Col. 16, lines 34-49). Schaefer, however, fails to teach or suggest that a graphical symbol representative of the corresponding process variable being wound up, as recited in claims 14 and 34.

For claims 15 and 35, Applicants respectfully traverse the Examiner's assertion that "Schaefer et al. also teaches the graphical shape is a circle positioned along the gauge axis (figure 1, column 9, lines 39-66). Applicants respectfully submit that figure 1 and column 9, lines 39-66 of Schaefer fails to show a graphical shape of a circle positioned along the gauge axis, as recited in claim 15 and 35, but rather shows line segments positioned along the "spokes".

For claims 16-18, 20, 36, 37 and 39, Applicants respectfully traverse the rejections and repeat the arguments presented above for claims 1 and 21 in support of the patentablility of claims 16-18, 20, 36, 37 and 39.

For claims 19, the Examiner asserts that "van Weele et al. discloses a matrix display having the manipulated variables displayed along a first axis thereof and the controlled variables

displayed along a second axis thereof, wherein each of the manipulated and controlled variables includes a graphical device displayed in proximity thereto (column 43, lines 9-40)." Applicants respectfully traverse the rejection.

Applicants respectfully submit that van Weele fails to teach the above-recited subject matter of claim 19. Rather, van Weele teaches "Cartesian coordinates defining an independent axis 364 and a dependent axis 366" on which "[a] graphical indication, at 376, of the intersection of the current real-time values for the subject PCC variable may be depicted, to graphically indicate the relationship between the current actual dependent and independent values and the ideal . . ." (Col. 35, lines 36-61). At column 43, lines 9-40, van Weele recites, in part, that "[t]he Active Alarms Window 262 preferably contains a list of all active alarms generated by all the PCCs for which the operator station 20 is assigned in the alarm box 264 . . . [and that] [t]he operator can acknowledge an active alarm while in the Active Alarms Window 262 via activation of the common element pop-Up menu . . . [t]he Active Alarms Window 262 may also include a menu bar 266, from which one or more commands may be activated . . . ." Van Weele, however, does not teach or suggest a matrix display with manipulated variables displayed along a first axis and the controlled variables displayed along a second axis, or a graphical device displayed in proximity to each of the manipulated and controlled variables, as recited in claim 19.

For claim 38, the Examiner asserts that van Weele, at column 6, lines 30-65, demonstrates the method recited in claim 38. Applicants respectfully traverse the rejection. Applicants respectfully repeat the argument presented above for claim 19 in support that van Weele fails to teach or suggest displaying a matrix display having manipulated variables displayed along a first axis of the matrix and the controlled variables displayed along a second axis of the matrix, as recited in claim 38. Furthermore, at column 6, lines 30-65 of van Weele recites, in part, that "[t]he CSF indicator may be represented graphically as a circle divided into two contrasting shades forming a pie chart . . . [t]he operator station . . . also preferably includes other graphical indicators . . . which indicate the status of selected process parameters in a

standard format . . . [and that] [t]he display means may also further include a flowsheet display area for displaying at least one graphic sheet including a graphical representation of the portion of the process . . . ." The portion of Van Weele cited by the Examiner, however, fails to teach or suggest displaying a matrix display having manipulated variables displayed along a first axis of the matrix and the controlled variables displayed along a second axis of the matrix, as recited in claim 38.

Based on at least the forgoing reasons, the Office Action fails to establish a *prima facie* case of obviousness for the rejection of claims 1, 3-5, 7-21, 23-25 and 27-39. Applicants respectfully request reconsideration and allowance of claims 1, 3-5, 7-21, 23-25 and 27-39.

Summary

It is respectfully submitted that the pending claims 1, 3-5, 7-21, 23-25 and 27-39 are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for

Guerlain et al.
By
Mueting, Raasch & Gebhardt, P.A.
P.O. Box 581415
Minneapolis, MN 55458-1415
Phone: (612) 305-1220
Facsimile: (612) 305-1228
Customer Number 26813

7 Feb 2002
Date

By: _____
Mark J. Gebhardt
Reg. No. 35,518
Direct Dial (612)305-1216

CERTIFICATE UNDER 37 CFR §1.8:
The undersigned hereby certifies that this paper is being deposited with the United States Postal Service as first class mail, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on this 7TH day of February, 2002.

By: _____
Name: Mark J. Gebhardt

APPENDIX A - SPECIFICATION/CLAIM AMENDMENTS INCLUDING NOTATIONS TO INDICATE CHANGES MADE
Serial No.: 09/345,335
Docket No.: H16-25553

Amendments to the following are indicated by underlining what has been added and bracketing what has been deleted.

In the Claims

Claims 1, 3-5, 7-21, 23-25 and 27-39 are pending. For convenience, all pending claims are shown below.

1. (Amended) A graphical user display for providing real-time process information to a user for a process that is operable under control of one or more process variables, wherein one or more of the process variables has high and low process limit values associated therewith, the graphical user display comprising one or more graphical devices, wherein each graphical device corresponds to a process variable, wherein at least one graphical device for a corresponding process variable includes:

a gauge axis;

[at least one pair] a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable and a second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable, where the first and second pair of high and low limit elements are displayed on the gauge axis[representative of high and low process limit values for the corresponding process variable]; and

a graphical shape displayed along the gauge axis representative of a value of the corresponding process variable relative to the process limit values.

3. (Amended) The graphical user display of claim [2] 1, wherein the at least one graphical device includes a first pair of parallel lines extending orthogonal to the gauge axis representative of the engineering hard high and low limit values for the corresponding process variable and a second pair of pair of parallel lines extending orthogonal to the gauge axis

representative of the operator set high and low limit values for the corresponding process variable.

4. The graphical user display of claim 3, wherein a single pair of parallel lines extending orthogonal to the gauge axis represent both the engineering hard high and low limit values and the operator set high and low limit values for the corresponding process variable when the operator set high and low limit values are set at the engineering hard high and low limit values.

5. The graphical user display of claim 3, wherein the second pair of parallel lines extending orthogonal to the gauge axis representative of operator set high and low limit values are displayed at a shorter length than and between the first pair of parallel lines extending orthogonal to the gauge axis representative of engineering hard high and low limit values along the gauge axis.

7. (Amended) The graphical user display of claim [6]3, wherein the graphical shape is positioned adjacent one of the first or second pair of high and low limit elements when the value for the corresponding process variable is within a certain range of the engineering hard high and low limit values or the operator set high and low limit values [one of the high and low process limit values].

8. (Amended) The graphical user display of claim [6]3, wherein the graphical shape is positioned outside of the parallel lines of the second pair of high and low limit elements when the value for the corresponding process variable is outside the operator set high and low process limit values by a predetermined percentage.

9. The graphical user display of claim 1, wherein the graphical device further includes a graphical symbol representative of an optimization characteristic for the corresponding process variable.

10. The graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable to be maximized.

11. The graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable to be minimized.

12. The graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable which is to be held at a resting value.

13. The graphical user display of claim 1, wherein the at least one graphical device further includes a graphical symbol representative of the corresponding process variable being constrained to set point.

14. The graphical user display of claim 1, wherein the at least one graphical device further includes a graphical symbol representative of the corresponding process variable being wound up.

15. The graphical user display of claim 1, wherein the graphical shape is a circle positioned along the gauge axis.

16. The graphical user display of claim 1, wherein the graphical shape has a color of a set of colors that reflects the state of the current value for the corresponding process variables.

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17. (Amended) The graphical user display of claim 16, wherein a color for the graphical shape represents one of a current value of the corresponding process variable being within the second pair of high and low [process] limit values, the current value of the corresponding process variable being within a percentage of one of the second pair of high and low [process] limit values, and the current value of the corresponding process variable being outside of the second pair of high and low [process] limit values.

18. The graphical user display of claim 1, wherein the process is a continuous multivariable process being performed at a process plant, wherein the continuous multivariable process is operable under control of at least manipulated variables and controllable variables of the one or more process variables.

19. The graphical user display of claim 18, wherein the graphical user display includes a matrix display having the manipulated variables displayed along a first axis thereof and the controlled variables displayed along a second axis thereof, wherein each of the manipulated and controlled variables includes a graphical device displayed in proximity thereto.

20. The graphical user display of claim 1, wherein each graphical device displayed is selectable for navigation to more detailed information for process variable corresponding to the selected graphical device, wherein the detail information is displayed on the same screen therewith.

21. (Amended) A computer implemented method for providing a graphical user display for providing real-time process information to a user for a process that is operable under control of one or more process variables, wherein one or more of the process variables has high and low process limit values associated therewith, the method comprising the step of displaying at least one graphical device for a corresponding process variable, wherein displaying the at least one

graphical device includes:

displaying a gauge axis;

displaying [at least one pair] a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable and a second pair of high and low elements representative of operator set high and low limit values for the corresponding process variable on the gauge axis[representative of high and low process limit values for the corresponding process variable]; and

displaying a graphical shape along the gauge axis representative of a value of the corresponding process variable relative to the high and low process limit values.

23. (Amended) The method of claim [22] 21 , wherein displaying the first pair of high and low limit elements representative of engineering hard high and low limit values includes displaying a first pair of parallel lines extending orthogonal to the gauge axis, and further wherein displaying the second pair of high and low limit elements representative of operator set high and low limit values includes displaying a second pair of parallel lines extending orthogonal to the gauge axis.

24. (Amended) The method of claim [22] 21, wherein displaying at least one pair of high and low limit elements includes displaying a single pair of parallel lines extending orthogonal to the gauge axis to represent both the engineering hard high and low limit values and the operator set high and low limit values for the corresponding process variable when the operator set high and low limit values are set at the engineering hard high and low limit values.

25. The method of claim 23, wherein the second pair of parallel lines extending orthogonal to the gauge axis representative of operator set high and low limit values are displayed at a shorter length than and between the first pair of parallel lines extending orthogonal to the gauge axis representative of engineering hard high and low limit values.

27. (Amended) The method of claim [26]23, wherein displaying the graphical shape along the gauge axis includes displaying the graphical shape at position adjacent one of the first or second pair of high and low limit elements when the value for the corresponding process variable is within a certain range of one of the high and low process limit values.

28. (Amended) The method of claim [26]23, wherein displaying the graphical shape along the gauge axis includes displaying the graphical shape at position outside of the parallel lines when the value for the corresponding process variable is outside the second pair of high and low elements representative of operator set high and low process limit values by at least a predetermined percentage.

29. The method of claim 21, wherein the method further includes displaying a graphical symbol representative of an optimization characteristic for the corresponding process variable along the gauge axis.

30. The method of claim 29, wherein the graphical symbol is representative of a corresponding process variable to be maximized.

31. The method of claim 29, wherein the graphical symbol is representative of a corresponding process variable to be minimized.

32. The method of claim 29, wherein the graphical symbol is representative of a corresponding process variable which is to be held at a resting value.

33. The method of claim 21, wherein displaying the graphical shape along the gauge axis further includes displaying a graphical symbol representative of the corresponding process variable being constrained to set point.

34. The method of claim 21, wherein displaying the graphical shape along the gauge axis further includes displaying a graphical symbol representative of the corresponding process variable being wound up.

35. The method of claim 21, wherein displaying the graphical shape along the gauge axis includes displaying a circle along the gauge axis.

36. The method of claim 21, wherein the method further includes:

determining a state of a current value for the corresponding process variable; and

displaying the graphical shape in a color of a set of colors that reflects the determined state for the corresponding variable.

37. (Amended) The method of claim 36, wherein determining the state of the current value includes determining whether the current value of the corresponding process variable is within the second pair of high and low [process] limit values, whether the current value of the corresponding process variable is within a certain percentage of one of the second pair of high and low [process] limit values, and whether the current value of the corresponding process variable is outside of the second pair of high and low [process] limit values.

38. The method of claim 21, wherein the process is a continuous multivariable process being performed at a process plant, wherein the continuous multivariable is operable under control of at least manipulated variables and controlled variables of the one or more process variables, and further wherein the method includes:

displaying a matrix display having the manipulated variables displayed along a first axis thereof and the controlled variables displayed along a second axis thereof; and

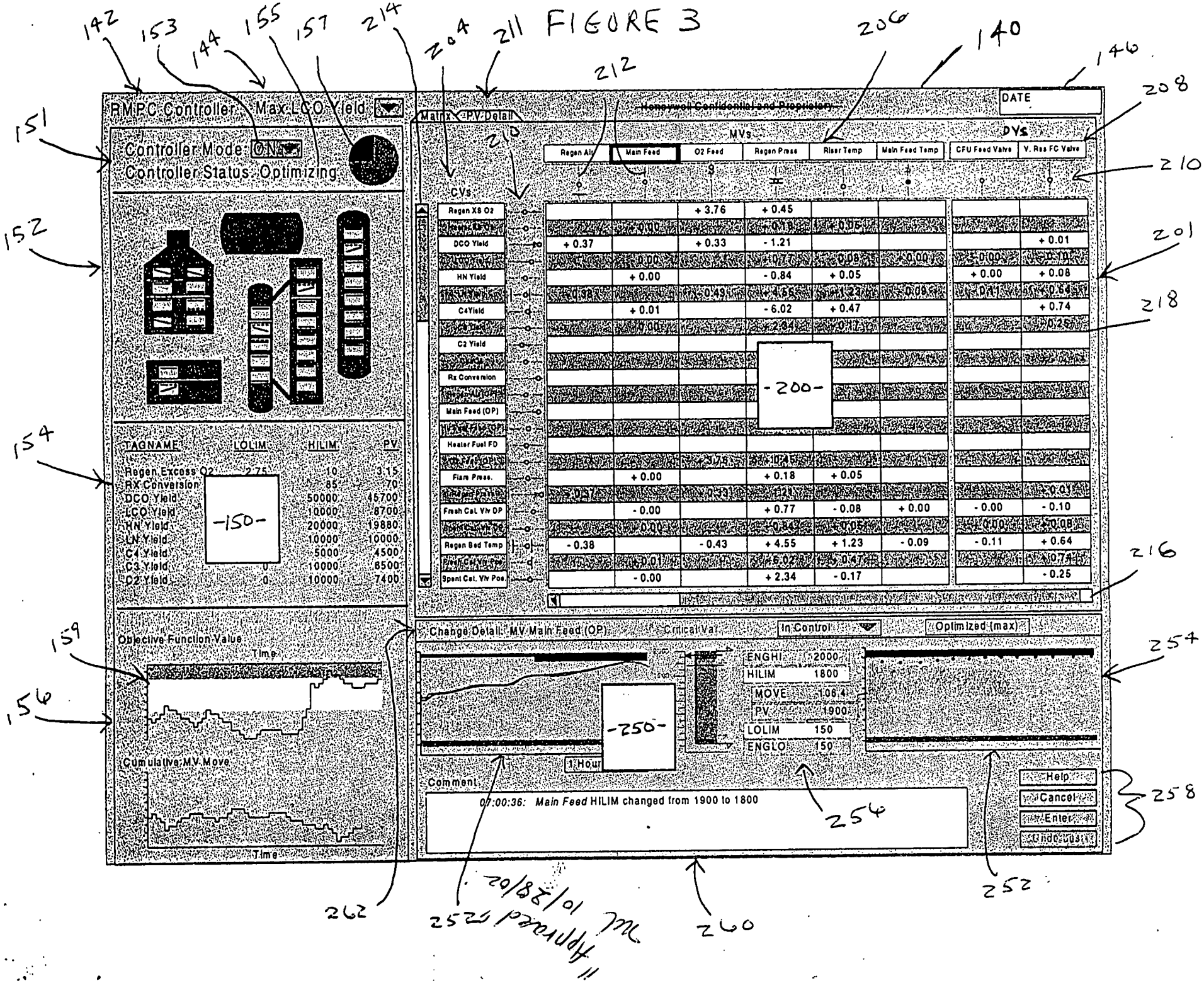
displaying a graphical device in proximity to each of the manipulated variables and controlled variables.

39. The method of claim 21, wherein the method further includes:

receiving user input to select a displayed graphical device; and

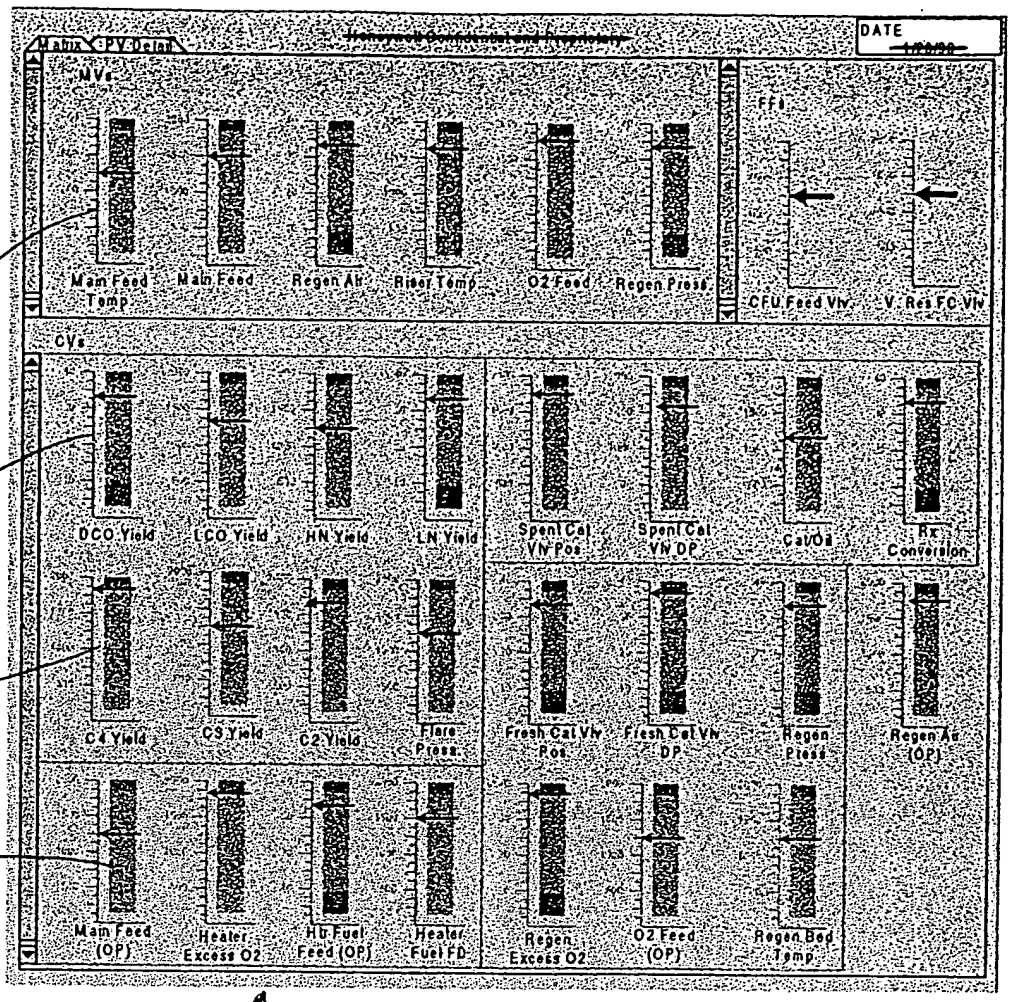
displaying detailed information for the process variable corresponding to the selected graphical device, wherein the detailed information is displayed on the same screen with the graphical device.

FIGURE 3



142 153 144 155 157 214 204 211 212 206 140 146 208 151 210 152 201 218 154 216 159 254 156 258 262 252 252 260

Approved 10/28/02 MC



280

280

230

FIGURE 11